

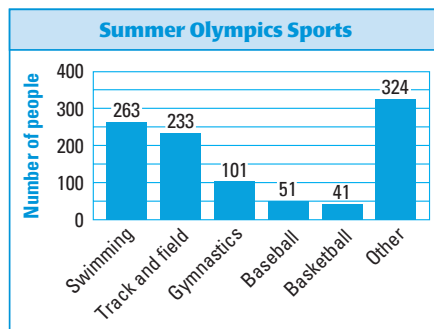
Lessons 10.1–10.3

- MULTI-STEP PROBLEM** Five people walk into a movie theater and look for empty seats.
 - Find the number of ways the people can be seated if there are 5 empty seats. **120 ways**
 - Find the number of ways the people can be seated if there are 8 empty seats. **6720 ways**
 - Generalize your results from parts (a) and (b) by writing an expression involving factorials for the number of ways the people can be seated if there are n empty seats. **$\frac{n!}{(n-5)!}$**
 - What is the minimum value of n such that there are at least 1 million ways the people can be seated? **18 empty seats**
- MULTI-STEP PROBLEM** You and a friend are meeting at the gym to work out. You both agree to arrive between 9:00 A.M. and 9:30 A.M. You will wait for each other for up to 10 minutes.
 - Let x be your arrival time (in minutes after 9:00 A.M.), and let y be your friend's arrival time (in minutes after 9:00 A.M.). Write inequalities representing the time intervals in which you and your friend arrive.
 $0 \leq x \leq 30, 0 \leq y \leq 30$
 - If you and your friend are to meet, the difference between your arrival times must not exceed 10 minutes. Write two inequalities that show this fact.
 $x - y \leq 10, y - x \leq 10$
 - Graph your inequalities from parts (a) and (b) in the same coordinate plane. **See margin.**
 - Using your graph from part (c), find the probability that you and your friend will meet at the gym. **$\frac{5}{9}$**
- GRIDDED RESPONSE** You want to make a fruit smoothie using 3 of the fruits listed. How many different fruit smoothies can you make?
56 fruit smoothies

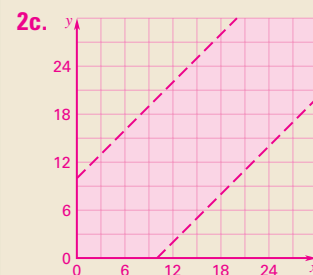


- Orange
- Banana
- Strawberry
- Pineapple
- Canteloupe
- Watermelon
- Kiwi
- Peach

- GRIDDED ANSWER** In a high school fashion show, how many ways can 1 freshman, 2 sophomores, 2 juniors, and 3 seniors line up in front of the judges if the contestants in the same class are considered identical?
24 ways
- EXTENDED RESPONSE** The graph shows the results of a survey in 2004 that asked U.S. adults which sport they would most like to participate in at the Summer Olympics.



- Find the probability that a randomly selected U.S. adult would like to participate in track and field. **about 0.23**
 - Is your answer from part (a) a *theoretical* or *experimental* probability? **Explain. See margin.**
 - What are the odds in favor of a randomly selected U.S. adult preferring to participate in gymnastics? **$\frac{101}{912}$**
- SHORT RESPONSE** You must take 18 elective courses to meet your graduation requirements for college. There are 30 courses that you are interested in. Does finding the number of possible course selections involve *permutations* or *combinations*? *Explain.* How many different course selections are possible? **See margin.**
 - OPEN-ENDED** Give an example of a real-life problem for which the answer is the sum of two combinations. Show how to find the answer. **See margin.**
 - GRIDDED ANSWER** An ice cream shop offers a choice of 31 flavors. How many different ice cream cones can be made with three scoops of ice cream if each scoop is a different flavor and the order of the scoops is not important?
4495 ice cream cones



5b. Experimental; the results are the probability of a certain number of responses.

6. Combinations; the order of the courses is not important; 86,493,225 course selections.

7. Sample answer: You are buying your mother a bouquet of flowers for her birthday. You want to include 3 of the 7 types of roses and 4 of the 8 types of calla lilies. How many different bouquets of flowers do you have to choose from?